

ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

No. 3]

[1915

XI.—NOTES ON SOUTH AFRICAN SANTALACEAE.

THESIDIUM.

The genus *Thesidium* falls naturally into two parts, making a useful subdivision for purposes of classification. In some of the species the male and female plants are quite similar in general appearance, while in the others they are so unlike that without evidence from the collector it is hardly possible to assign specimens of male plants to their proper females.

To the group of species with similar male and female plants belong *T. exocarpaceoides*, Sond., *T. Thunbergii*, Sond. and *T. fragile*, Sond., while those with the males and females unlike are *T. hirtum*, Sond., *T. minus*, A. W. Hill, *T. fruticosum*, A. W. Hill and *T. longifolium*, A. W. Hill.

That the difficulty with these dissimilar forms is a real one is shown by the fact that De Candolle described as two species (*Thesium globosum* and *Thesium strigulosum**), the female and male plants respectively of one and the same species which Sonder rightly included together under the name of *Thesidium hirtum* (in *Flora*, 1857, 365).

Of the three new species *T. longifolium* is the most striking from the conspicuous disparity between the two sexes; the male plant closely resembles that of *T. fruticosum*, while the female with its comparatively long stems and elongate, lanceolate leaves and bracts, is distinct from any other species and quite unlike the male. Throughout this small genus the male flowers show scarcely any difference, and the female flowers also are not markedly different in the several species.

The species, therefore, have to be separated almost entirely on vegetative characters, and especially on those of the bracts and bracteoles. Between the species with the males and females resembling each other the differences are not very well marked, and

* A. DC. Esp. Nouv. Thes. 1857, p. 4; placed under *Thesidium*, but both species retained in DC. Prodr. xiv. 673.

T. exocarpaceoides (*Thesidium microcarpum*, A.DC. in DC. Prodr. xiv. 674), *T. Thunbergii* (*T. podocarpum*, A.DC. in DC. Prodr. lc.), and *T. fragile* form a nicely graduated series of closely allied species. It is possible that *T. Thunbergii* may represent only a lax form of *T. fragile*, as the characters which can be used to separate them are not very precise.

Thesium leptostachyum, described by De Candolle from a male specimen only, may prove to be conspecific with *T. minus* described below. Dr. C. Lindman has very kindly sent a drawing of the small specimen preserved at Stockholm and compared it with a male plant of *T. minus*. *T. leptostachyum* has a distinctly verruculose stem and the edges of the bracts and perianth segments are fringed with fine hairs, while in *T. minus* the hairs are absent. It seems best therefore to leave De Candolle's species undisturbed until a more comprehensive collection of the species of *Thesidium* can be made.

But little interest would seem to have been taken in the genus by South African botanists, though it is one which would repay further study if only from the sowing of seed in order to ensure the proper correlation of the male and female plants.

T. longifolium has only been collected by Bolus and most of the other species are poorly represented in herbaria.

***Thesidium minus*, A. W. Hill;** species annua, parva, subglabra, plantis masculis et feminis dissimilibus, bracteis in plantis masculis floribus brevioribus vel subequalibus distinguenda.

Planta annua; radix princeps robusta; caules praesertim in plantis masculis numerosi, e rhizomate erecti vel patuli, superne parce ramosi, 7-15 cm. longi, costati, fere omnino floriferi, subglabri. *Folia* inferiora anguste lineari-lanceolata vel acicularia, costa distincta, 0.6-1.2 cm. longa, conspicua, in plantis feminis sensim in bracteis lineares in plantis masculis abrupte in bracteis subulatas mutantia. *Inflorescentiae* simplices vel ramosae; bractee bracteolaeque ovato-lanceolatae vel subulatae, naviculares, curvatae, acutae, leviter carinatae, floribus aequales vel breviores, 1 mm. longae, marginibus translucentibus vix scabridis verruculosis. *Flores* sessiles, e cymulis 3-floris constituti in glomerulos axillares dispositi; perianthium 0.75 mm. longum; segmenta patula, 0.5 mm. longa. *Inflorescentiae* simplices vel ramosae; bractee foliosae, erectae vel patulae, lineares vel aciculares, abrupte acutae, 3-5 mm. longae, carinatae, subscabridulae marginibus carinisque membranaceis; bracteolae 1.25 mm. longae, floribus subaequales vel breviores, plicatae, acute carinatae. *Flores* plerumque solitarii, interdum floribus lateralibus demum evoluti, breviter pedicellati; perianthium circiter 0.5 mm. longum; segmenta 0.35 mm. longa, marginibus plus minusve undulatis; stylus 0.25 mm. longus. *Fructus* globosus, 1 mm. diametro, prominenter reticulatus, stipite 1 mm. longo.

SOUTH AFRICA. Caledon Div.; Houw Hoek, 380 m., *Schlechter* 9431! 9432! near Vogelgat, 380 m., *Schlechter* 10,415 ?. Bredasdorp Div.; Riet Fontein Poort, near Elim, *Bolus* 8601! Riversdale Div.; near Riversdale, *Rust* 280! Garcias Pass, 1200 ft., *Galpin* 4554!

T. fruticulosum, A. W. Hill; species suffruticosa, robusta, ramulorum, costis et bracteis verruculosis vel subscabridulis bracteis floribus paullo longioribus, floribus binis in bractearum cornearum axillis in plantis feminis distincta.

Suffrutex circiter 30 cm. altus; caules erecti vel patuli, in plantis masculis multe ramosi, robusti, lignosi, acute costati vel subangulati, costis verruculosis vel subscabridulis. *Plantae masculae*; rami numerosi, recti, patuli, costis prominenter verruculosis vel subscabridis, omnino et plus minusve dense floriferi; bracteae foliosae, lanceolatae, acutae, circiter 3 mm. longae, acute carinatae, supra planae, verruculosae vel subscabridulae, carina et marginibus transluculentibus; bracteolae 2.5 mm. longae, floribus longiores; flores in cymulas 3-floras axillares subsessiles; perianthium 1.25 mm. longum; segmenta triangulari-ovata, 0.75 mm. longa; antherae circiter 0.15 mm. longae. *Plantae feminae*: rami robusti, erecti, inflorescentiis axillaribus confertis ornati, angulati, angulis prominentibus corneis verruculosis; bracteae lanceolatae, 4-6 mm. longae, carinatae, carinis acute alatis in caule decurrentibus corneis et scabridis, marginibus plicatis scabridis; bracteolae bracteis similes, floribus longiores; flores in cymulas 2-floras dispositi, axillares, sessiles; perianthium circiter 0.75 mm. longum; segmenta erecta, 0.5 mm. longa; stylus robustus, 0.25 mm. longus. *Fructus* subsessilis globosus, 1-5 mm. diametro, conspicue reticulatus.

SOUTH AFRICA. Cape Div.; Table Mt., on Groene Kloof, *Galpin* 4556! Slang Kop, 220 m., *Wolley Dod* 3187! slopes near Buffels Bay, *Wolley Dod* 2869! Durban Hills, *Guthrie* 2407! Caledon Div., near Vogelgat, 320 m., *Schlechter* 10,414 (?) without definite locality, *Harvey* 709 ♂ and ♀!

T. longifolium, A. W. Hill; species eximia, conspicue scabridula, foliis elongatis, bracteis in plantis feminis speciosis alatis scabridulo-fimbriatis, floribus solitariis distincta.

Suffrutex circiter 38 cm. altus; caules erecti, basi lignosi, conspicue costati et angulati, costis angulisque scabrido-verruculosis. *Folia inferiora* anguste lineari-lanceolata, acuta, carinata, 2-2.5 cm. longa vel ultra, marginibus et carinis transluculentibus scabrido-verruculosis vel fimbriatis. *Flores* omnino subdense dispositi. *Plantae masculae*: bracteae patulae, ovato-lanceolatae, acutae, 3 mm. longae, marginibus carinisque transluculentibus scabridulis vel scabrido-fimbriatis; carinae ala conspicue decurrens; bracteolae 1.5 mm. longae, marginibus plicatis; flores in cymulas circiter 5-floras axillares, cymulis glomeratis; perianthium 1 mm. longum; segmenta 0.75 mm. longa; stylus rudimentarius frequenter evolutus. *Plantae feminae*: bracteae foliosae, conspicuae, lanceolatae, acutae, ascendentes vel leviter recurvatae, 1.2-1.4 cm. longae; bracteolae marginibus plicatis transluculentibus scabridulis vel scabrido-fimbriatis carina acuta; flores in bracteolis magnis inclusi, solitarii; perianthium 1 mm. longum; segmenta 0.5 mm. longa; discus prominens. *Fructus* globosus, circiter 2 mm. diametro, stipitatus, conspicue reticulatus.

SOUTH AFRICA. Cape Div.; eastern side of Table Mt., 380 m., *Bolus* 4607! 4608!

OSYRIS, RHOIACARPOS AND OSYRIDICARPOS.

Bergius founded the genus *Colpoon* to receive an *Osyris*-like plant with opposite leaves, and gives a figure in his Pl. Cap. tab. 1 fig. i. De Candolle in the Prodrômus did not retain the genus, but regarded it only as a section of *Osyris*, Linn., distinguished in possessing opposite leaves. In the Genera Plantarum, Benth and Hooker maintain both *Osyris* and *Colpoon*, and with the latter unite the genus *Rhoiacarpus*, A.DC or *Hamiltonia*, Harv.

In the forthcoming volume of the Flora Capensis it has not been found possible to uphold Bergius' genus *Colpoon*; the character of the opposite leaves is far from constant, and on the same specimen leaves may be found arranged in opposite or sub-opposite pairs or they may be more or less alternate. In floral characters no difference can be noticed between plants with alternate leaves placed under *Osyris abyssinica*, Hochst., and those with more or less opposite leaves formerly placed under *Colpoon compressum*, Berg. The leaves in all specimens are flat, glaucous- or grey-green and very variable in shape with mucronate apices; the inflorescences are as a rule axillary and inconspicuous, and there is no distinction between the fruits of the plants which have been assigned to the two genera.

Among the large range of specimens examined the general uniformity in appearance is remarkable, only two specimens preserved in the Bolus Herbarium are strikingly different from the type. In these the leaves and bracts are large and the inflorescences form conspicuous panicles, consequently they have been described as a variety.

Osyris abyssinica, Hochst., var. *speciosa*, A. W. Hill, a typo habitu bustiore, inflorescentiis subaphyllis multo exsertis, bracteis floribusque majoribus praecipue differt.

Caledon Div.; near Houw Hoek, 350 m. *Bolus*; near Hermanus Pietersfontein, 30 m., *Bolus* (specimens in Bolus Herbarium).

The genus *Rhoiacarpus*, A.DC., is retained in the forthcoming volume of the Flora Capensis, since not only can it be easily recognised but it appears to be sufficiently distinct from *Osyris* to be worthy of separate generic rank. The leaves are opposite, stout and leathery, varnished or polished above and with the margins slightly inrolled; the flowers are hermaphrodite, fleshy or leathery and fairly large, with a short but definite perianth-tube. Only one species, *R. capensis*, A.DC. has been recorded.

The genus *Osyridicarpus* appears to be represented in the Cape Region by only one species, *O. natalensis*, A.DC. The flower in the type is remarkable in possessing five external callosities at the base of the perianth-tube alternating in position with the perianth-segments. These callosities, which are very marked in some specimens are not evident in others, but their presence or absence does not appear to indicate specific difference. The morphology of these bodies is worthy of careful investigation.

GRUBBIA.

Grubbia occupies an anomalous position in the natural order

Santalaceae. In Harvey and Sonder's "Flora Capensis" it was included under *Hamamelidaceae*, but it has been redescribed for the forthcoming volume of the Flora Capensis under *Santalaceae*. De Candolle placed the genus in a separate natural order, *Grubbiaceae*, which immediately precedes the *Santalaceae* in the Prodromus, while Benth and Hooker place it in their fourth tribe, *Grubbieae*, at the end of *Santalaceae*, and consider the genus to be an anomalous one in the order.

Three species were described by De Candolle and four by Sonder.* Material of the types of the four species has been examined and it is clear that they should all stand.

G. stricta, with its many-flowered axillary strobili, is very distinct from the three other species, where the flowers are arranged in three-flowered fused cymules, and it was even described as a species of *Taxus* by Bergius.

G. rosmarinifolia, *G. pinifolia* and *G. hirsuta* form a very natural group of closely allied species.

G. pinifolia is distinguished from the common form, *G. rosmarinifolia*, especially in the leaves, which are not hastate at the base but are almost decurrent into the definite petioles. The stems and petioles are also minutely downy. Through the kindness of Dr. Lindman a piece of the type specimen of *G. pinifolia* (Stellenbosch, Ecklon and Zeyher) preserved at Stockholm has been examined and has been found to agree exactly with the specimen collected by MacOwan (No. 918) on Table Mountain.

G. hirsuta may be recognised by its very villous covering, by the undivided small bracts and also by the fruits, which are evenly covered by very short thick hairs:

THESIUM.

The synonym *Frisca*, Spach, reduced in the Index Kewensis to *Thesium*, is the result of a misprint made by Endlicher and perpetuated by Spach. R. Brown (Prod. Fl. Nov. Holl. p. 353) had previously written *T. frisca* when quoting the Linnean species *T. Frisea*.

The specific name *Frisea* was given by Linnaeus to a South African species of *Thesium* collected by Koenig. It was published with a capital initial letter and it is clear therefore that it was being treated as a generic name though no such genus had been published. The type specimen in the Linnean Herbarium is labelled *Frisea Koenigii*, apparently in Koenig's handwriting, and it seems probable that Linnaeus in determining the plant as a *Thesium* adopted Koenig's unpublished name.

The origin of the name *Frisea* cannot be traced. The error in spelling *Frisca* for *Frisea* has also led to a further curious mistake. The following is a quotation from Wittstein's Etymologisch-botanisches Handwörterbuch, an exceedingly useful work of its kind:—

"*Frisca* R. (Santalaceae). Nach Th. Frisca, der sich am Cap im botanischen Interesse aufhielt." The "R" here signifies Reichenbach, but this botanist wrote (Consp. Reg. Veg. p. 80), not

* Sonder in Harvey and Sonder, Fl. Cap. ii. pp. 325-327.

Frisca, but *Frisea*, using the name for a subgenus or section of *Thesium*, and adopting it doubtless from *Thesium Frisea*, Linn. Mant. ii. p. 213. Endlicher (Gen. Plant. p. 326) and Spach (Hist. Veg. Phan. x. p. 460), have incorrectly written *Frisca*, attributing the name to Reichenbach. Wittstein therefore was not the originator of this mistake, but by a curious misreading of the following paragraph from Endlicher's General Plantarum he is responsible for evolving from what is merely the name of a plant, a person who, in the interests of botany, sojourned at the Cape.

Endlicher wrote:—"Frisca Reichenb. Consp. 80. Thesii sp. capenses Auct. Th. Frisca, crassifolium, funale, spicatum. . ." "Th. Frisca" is of course nothing more than *Thesium Frisea*.

The following reduction should have been included in my paper on *Thesium* in *K.B.* no. 1, 1915:—

T. Zeyheri, A.DC. Esp. Nouv. Thes. 6; A.DC. in DC. Prodr. xiv. 666; Sond. in Flora, 1857, 407. *T. transgariëpinum*, Sond. in Flora, 1857, 356. *T. longirostre*, Schlechter in Journ. Bot. 1897, 345; ex A. W. Hill in Kew Bull. 1910, 186. *T. Schlechteri*, A. W. Hill in Dyer Fl. Trop. Africa, vi. 1, 415.

The species has a somewhat curious distribution having been recorded in South Africa only from the eastern districts, E. of Long. 28°, while in Tropical Africa the only known habitat is in the Auas mountains, German South West Africa.

A. W. HILL.

XII.—FOMES JUNIPERINUS AND ITS OCCURRENCE IN BRITISH EAST AFRICA.

E. M. WAKEFIELD.

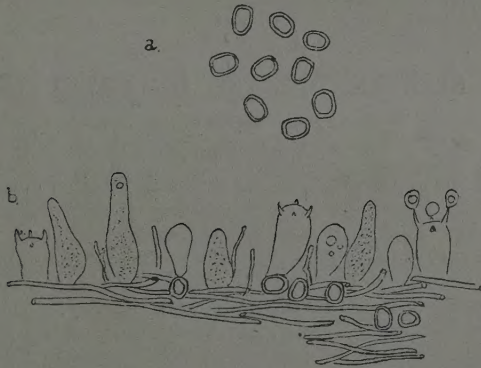
An interesting specimen, illustrating the wide distribution of many fungi of economic importance, has been received from the East Africa Protectorate. Amongst some fungi sent for determination by Mr. W. J. Dowson, Government Mycologist, Nairobi, were two fine specimens of *Fomes juniperinus* (Schrenk) Sacc. & Syd. On inquiry as to the circumstances under which they were found, Mr. Dowson kindly supplied the following information:—

"No. 176. This is the most serious parasite occurring in the East African forests, and, so far as is known, is only found on the indigenous cedars. The commonest cedar, and the only one named, is *Juniperus procera*, but there are probably others. *J. procera* is found at altitudes varying between 7000 and 9000 feet, where it is not too damp (i.e., just north of Nairobi, on the Aberdare Range, both Kikuyu and Mau escarpments of the Rift Valley, and on the north-west slopes of Mount Kenia. The south-east half of Kenia is much moister).

"The sporophores always arise just below a withered branch, which has evidently been dead many years. Trees carrying sporophores when cut down are always rotted very considerably at the centre. Large trees of five feet in diameter have holes in them from anything up to two feet across. The edges of these cavities are jagged and irregular, the portions in between the projections having been reduced to a soft, spongy mass."

Fomes juniperinus was described by von Schrenk*, as causing a "White Rot" of the Red Cedar (*Juniperus virginianus*) in the eastern United States, characterised by the formation of long holes in the heart-wood. The African specimens agree well with his description, both of the sporophore and of the type of disease caused by the fungus. The species is recognisable by the yellowish pores, and the brick-red colour of the flesh and the older layers of tubes. Murrill† has described *Fomes Earlei* (Murr.) Sacc. & D. Sacc., also on *Juniperus*, which he states is closely related to *F. juniperinus*, but differs in being more rimose, having larger pores, and lacking the annual projecting margins of the older tube layers which occur in the two original specimens of *F. juniperinus*. The descriptions of the two species, however, differ only in minor details, although Hedgcock and Long‡ have maintained that they are distinct and cause different types of "rot."

Of the two specimens from East Africa one is broadly ungulate, but little cracked, and velvety tomentose, especially at the margin; the other is much more rimose and elongated, with scarcely any tomentum, agreeing, therefore, in habit with "*F. Earlei*." The pores in both reach the edge of the pileus, where, however, they are not properly developed; and in one specimen, in which two seasons' growth of pores is visible, the pores of the last season are 2-3 to a mm., while those of the previous season are 1-2 to a mm., so that the differences in pore-size, given as one of the marks of distinction for the two species, may be found in one and the same specimen.



The spores (Text-fig. a) are very abundant, $6-8 \times 5-6 \mu$, broadly elliptical or oblong, and more or less angular in shape, thick-walled, pale yellow in the youngest pores, but red-brown in the older pores, as stated in the original description. The structure of the hymenium is very difficult to see, on account of the delicacy

* H. v. Schrenk. Two Diseases of Red Cedar. Bull 21, U.S. Dep. Agric., Div. of Veg. Phys. and Path., 1900.

† Murrill. Bull. Torr. Bot. Club, xxx, 1903, p. 116, and in North American Flora, ix, pp. 106-7.

‡ Hedgcock & Long in Mycologia, iv, 1912, p. 109.

of the elements and the abundance of spores, and discrepancies occur in the various descriptions published, as to the presence of cystidia. Schrenk mentioned "blunt cystidia" projecting but little over the surface of the hymenium. Hedgecock and Long describe for *F. juniperinus* "cystidia few, nearly colourless, $100 \times 20 \mu$, pointed, somewhat encrusted," and for *F. Earlei* no cystidia, while Lloyd*, who examined part of the type specimen of *F. juniperinus*, states that no cystidia are present. In the specimens at Kew, the hymenium consists of young and mature basidia, the latter with 2-4 sterigmata, and between these are occasional sterile bodies of varying size (Text-fig. b). These are hyaline, very thin-walled, smooth, cylindrical or somewhat fusiform, projecting very little, 7μ wide and up to 25μ long. Without an examination of the type material, it is not possible to say whether these may be von Schrenk's cystidia. No large cystidia like those described by Hedgecock and Long are present.

The distribution of the fungus, as at present known, is peculiar. In the United States *F. juniperinus* has been recorded from Tennessee, Kentucky and Maryland, and *F. Earlei* from Texas, New Mexico, Arizona and Colorado. Lloyd† has recorded it from Russia, and has pointed out* that *F. Demidoffii* (Lév.) Sacc., described on *Juniperus excelsa* from Russia, was probably the same species. The new record from East Africa gives a third widely separated locality. The fungus does not as yet appear to have been recorded from any other part of the world, and even where found, the sporophores seem to be as a rule but sparingly produced.

XIII.—BLISTER DISEASE OF FRUIT TREES.

G. MASSEE.

(With Plate.)

The blistering and cracking of the shoots and fruit of apple, pear and cherry trees is of common occurrence, and in many instances, more especially when the fruit is attacked, the injury is of a serious nature. The general superficial appearance of the disease resembles that of apple scab, caused by *Venturia inaequalis*, Aderh., and as such has up to the present been mistaken in this country, although what appears to be the same disease, has been described by Pole-Evans‡ and P. A. van der Bijl§ as present on apple trees in South Africa. In this instance, however, the authors were only acquainted with one stage in the life-cycle of the fungus concerned, to which they applied the name *Coniothecium chomatosporum*, Corda.

Small blisters during July and August on the young shoots of the year is the first indication of the presence of the disease. Later in the season the skin or epidermis covering these blisters is ruptured, and a blackish-olive patch is exposed, which on microscopic examination

* Lloyd. Mycol. Notes, No. 38, 1912, p. 522.

† Lloyd. Letter No. 38, p. 10.

‡ Pole-Evans, I. B., Transvaal Agric. Journ., 5, p. 680 (1907).

§ Bijl, Paul A. van der. S. African Agric. Journ., 8, p. 64 (1914).

proves to consist of a tangled mass of olive-coloured mycelium, which gives origin to numerous clusters of various sizes, composed of very large, globose cells, each having two septa crossing at right angles. This condition of the fungus under consideration was at one time considered as an entity, and was known as *Coniothecium chomatosporum*, Corda. During the autumn and winter the dark-coloured mycelium, emerging through the ruptured blisters, spreads on the surface of the shoot, forming blackish-olive patches of varying extent. The mycelium of the fungus is confined to the cortex, which is killed down to the wood, and during the winter the branch dies. In the spring the masses of large cells of the *Coniothecium* give origin to myriads of small, elliptical, hyaline spores by a process of budding, and these minute spores are capable of infecting young apple shoots, and giving origin to the *Coniothecium* condition of the fungus, which is thus capable of reproducing itself indefinitely without the intervention of the two other stages of the fungus to be described, known respectively as *Phoma mali*, Schulz and Sacc., and *Diaporthe ambigua*, Nits., the latter being the ascigerous form. The *Phoma* and the *Diaporthe* are both pure saprophytes, appearing on the branches killed by the *Coniothecium*, which is the only parasitic form included in the life-cycle of the fungus.

The small, hyaline spores produced by budding from the large *Coniothecium* cells were placed on sterilised and uninjured young apple shoots, protected from outside infection by waterproof paper. After an interval of seven weeks, small blisters were present on the shoot, which, on microscopic examination, proved to be caused by the growth of masses or conglomerations of large *Coniothecium* cells. These masses continue to increase in size and press the epidermis upwards, at first forming a wart or blister; eventually the epidermis is ruptured. The blisters invariably first appeared close to the lenticel, which suggests that infection only occurs at these points, and that the budding spores cannot enter through the unbroken epidermis. In course of time, the mycelium spreads in the cortex, and blisters, due to clusters of cells, may appear at any point on the shoot. When budding spores are sown in a nutritive medium, the mycelium is at first colourless and very slender, and gradually passes through a pale olive to an almost opaque blackish-olive colour, and at the expiration of about six weeks, numerous conglomerations of large cells are present. The large cells commence budding at once. When petri-dish cultures of budding spores are about three months old, the *Phoma* stage of the fungus is produced in abundance. *Phoma* spores from such cultures, sown in a nutrient medium, gave origin, first to the *Coniothecium* condition and afterwards to the *Phoma*. *Phoma* spores from the same source, when placed on young apple shoots, gave origin to the *Coniothecium* condition of the fungus. In every experiment with *Phoma* spores, whether obtained from pure cultures or from the *Phoma* on shoots that had been killed the previous year by the *Coniothecium*, the first product of germination was the *Coniothecium* condition, followed by the *Phoma*; hence it may be concluded that the infection of young shoots and fruit may also be due to the *Phoma* stage of the fungus present on dead shoots.

When the fruit is attacked, the effect produced depends to a great extent on the age at which infection occurs. On the young, hard fruit

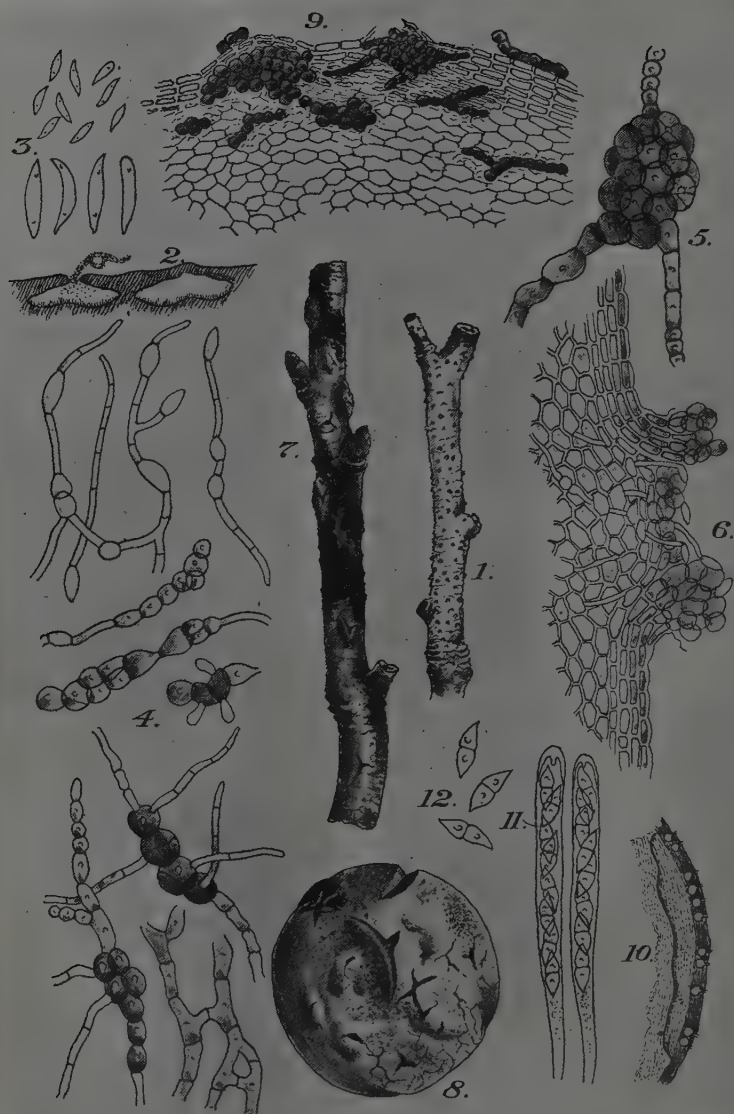
blisters are formed and the tissue is soon killed at the points of infection. This often results in the formation of cracks, which continue to increase in size as the apple grows. The general appearance in this case resembles that of apple scab. When the fruit is partly ripe, large, brown, depressed patches are formed, the skin becomes black and parchment-like, and numerous masses of *Coniothecium* are produced in the tissue. At a later stage, the *Phoma* form of fruit bursts through the blackened skin. In the case of the fruit, infection takes place through the numerous minute ruptures of the skin which are perhaps imperfectly-formed lenticels.

Coniothecium has for some time been considered of doubtful generic value. In "British Fungus Flora"* the following rider to the generic diagnosis occurs: "Conidia usually very variable, resembling conglomerations of cells of variable size. A very badly-defined genus, and it is doubtful whether many of the so-called species are such in reality." Mr. C. O. Farquharson was the first to demonstrate that *Coniothecium* resulted from the germination of *Phoma* spores, when working at a water-lily disease in the Jodrell laboratory, but the investigation was not completed owing to his departure for Southern Nigeria as mycologist. He also proved that the spores of *Phoma abietis*, Br., produced a *Coniothecium* stage on germination, hence, in future, *Coniothecium* will only be retained as a form-genus until its components are correlated with their respective *Phoma* forms.

The *Phoma* stage appears in great abundance in the spring on shoots and spurs killed by the *Coniothecium* the previous year. From other species of *Phoma* occurring on the same hosts, *P. mali* is readily distinguished by the form of the perithecium and the spores. The perithecium is very much vertically depressed, so that a section is irregularly biconvex. The spores are fusiform or spindle-shaped and measure $7-8 \times 2-3 \mu$. Spores of the *Phoma* placed on sterilised apple shoots were found to enter the tissue only through the lenticels. On germination, a web of very delicate hyaline mycelium surrounded the dead cells of the lenticel, and afterwards spread into the adjoining living tissue of the cortex, where they increased considerably in thickness and gradually assumed an olive-green colour, and gave origin to typical *Coniothecium* groups of cells. In all probability the mycelium first produced by the spores lives as a saprophyte, obtaining its food from the dead tissue of the lenticel, and afterwards assumes a parasitic habit. The parasitic phase is, however, not absolutely necessary, as when *Phoma* spores are sown in a nutrient medium the *Coniothecium* and *Phoma* stages are produced in due course. This, however, may not occur in nature, as I have not succeeded in infecting dead shoots with either *Coniothecium* or *Phoma* spores.

The ascigerous form of fruit is rare, and, as in many other cases, would appear to play but an unimportant part in the continuation of the species, either as regards time or space. It occurs on dead twigs either along with the *Phoma* or at a later stage. I have only met with the ascigerous stage once—on dead apple twigs, accompanying the *Phoma*. The ascigerous spores sown on a nutrient medium produced a dense mass of colourless mycelium, which gave origin to the *Phoma* without the intervention of the *Coniothecium*; the latter, how-

* Masee, G., Brit. Fungus Flora, 3, p. 427 (1893).



ever, was formed as usual from the *Phoma* spores obtained from the germination of ascigerous spores.

As to preventive measures, probably spraying with Bordeaux mixture, if applied sufficiently often, would save young shoots and fruit from infection, but the process would have to be repeated every season. The most certain method for preventing infection would be to remove the dead twigs and spurs bearing the fungus.

DESCRIPTION OF THE FIGURES.

1. *Phoma* stage of fungus on a dead apple twig. Nat. size.
2. Section of *Phoma* perithecia on apple shoot. Mag.
3. *Phoma* spores. Mag.
4. Various stages of germination of *Phoma* spores, and the production of the condition known as *Coniothecium* from the mycelium. Mag.
5. A more advanced condition of the *Coniothecium* stage. Mag.
6. Spores of the *Phoma* germinating on the surface of a lenticel of an apple twig. The mycelium is seen penetrating the tissue of the cortex. Mag.
7. Portion of an apple shoot showing the effect produced by the *Coniothecium* stage of the disease. Nat. size.
8. An apple showing the *Coniothecium* stage of the disease. Nat. size.
9. Section through the cortex of an apple twig, showing the *Coniothecium* in the tissues. Mag.
10. Section through the stroma and perithecia of *Diaporthe ambigua*, the ascigerous stage of the fungus. Mag.
11. Asci and spores of *Diaporthe ambigua*. Mag.
12. Free spores of *Diaporthe ambigua*. Mag.

XIV.—SOME CHINESE MARINE ALGAE.

A. D. COTTON.

Two packets of marine algae from Wei-hai-wei were recently presented to Kew by the Rev. H. Boyden, of Exeter. The material was collected by Mr. Boyden's son, Dr. P. Hamilton Boyden, surgeon in the Royal Navy, mainly during 1913, but some specimens bear the date October, 1910.

In the *Journal of Botany* for 1904 Mrs. Gepp reported on a collection from the same locality, also made by Dr. Boyden, and this is practically the only recent list—at all events in a European language—of marine algae from China. Some older papers, which include several Chinese records, are in existence, but, owing to the liberal views then held as to species, and to other reasons, these lists require thorough revision. The present collection differs decidedly from that examined by Mrs. Gepp, a fact which shows how the flora varies, and one which should be an encouragement to botanists and others who take the trouble to investigate the seaweed flora of these little-known shores. Though most valuable, the collections forwarded by Dr. Boyden can only be regarded as samples. The littoral flora doubtless varies, not only through the different months of the year, but also with the different types of habitat afforded by the coast-line. Further samples as opportunity offers would therefore be most welcome.

Much of the coast of northern China is unfavourable for a good seaweed flora. Owing to the presence of the great Hoang-ho, or

Yellow River, the Gulf of Pechilli is for the most part muddy, and in the neighbourhood of Shanghai the whole seaboard is poor owing to the enormous amount of fresh water brought down by the Yang-tse-kiang. Wei-hai-wei, though possessing a good rocky shore, appears to be rather barren. In a letter quoted by Mrs. Gepp in the *Journal of Botany* (vol. xlii. p. 161) Dr. Boyden writes as follows: "The fact which struck me most was the absence of large seaweeds, e.g., *Fucus* and *Laminaria*. Possibly this may be due to the sheltered situation of that part of Lin-kung-tao Island . . . but even on the seaward side there seemed to be very few. This may be due to the coldness of the water from the absence of a warm current, these waters being outside the influence of the Kurosiwo, or Japan stream. The specimens were got in pools left by the tide in the rocks, which were for the most part flat. On the seaward side the rocks are very precipitous, shelving down several hundred feet. The rocks are metamorphic, consisting of beds of quartzite, gneiss, crystallite, and limestone, cut across by dykes of volcanic rock and granite. Mica abounds everywhere. Where the seaweeds were found the rocks were mostly granite and gneiss." Dr. Boyden's 1913 material evidently contains several littoral and rock-pool species, but such plants as *Desmarestia viridis* and the species of *Sargassa* were doubtless washed ashore from the sub-littoral region.

During the ordinary routine work in the Herbarium specimens of Chinese algae, mostly un-named, have from time to time been noted. These are chiefly from Hongkong and Macao, but unfortunately they are in rather poor condition. It has, however, been possible to determine several species, and, as the marine flora of China is so little known, it seems advisable, even though they belong to a district far south of Wei-hai-wei, to take this opportunity of putting them on record. Some Formosan specimens which exist at Kew may also be included in the list, as this island, though belonging to Japan, must geographically be included with China. The majority of these southern records consists, as would be expected, of members of well-known and common genera. The *Sargassa* bulk largely, and for assistance in naming these the writer is much indebted to Professor K. Yendo, who, during his visit to England last year, was kind enough to examine the whole of the *Sargassa* material from the Far East in the Kew herbarium. Dr. Yendo has spent many years studying, in the living state, this exceedingly difficult genus, and his revision of the Japanese species will be found in the *Journal of the Tokyo College of Science* (vol. xxi. art. 12, pp. 1-174).

The only country of the East the marine algal flora of which is thoroughly known is Japan, and consequently this is the only one with which that of northern China can be properly compared. For Japan we have the very useful enumeration by Matsumura, published in his *Index Plantarum Japonicarum*, 1904 (vol ii. pp. 3-127). This is, however, somewhat out of date, owing to the large amount of critical systematic work lately carried out by Japanese algologists. For Corea, three papers only are in

existence, namely, a short list by Okamura in the *Japanese Botanical Magazine* for 1892 (pp. 117-118), a more lengthy one in the *Kew Bulletin*, 1906 (pp. 366-373), and a paper published two years ago by Okamura, which, besides furnishing many additional names, includes all previous records (The Marine Algae of Chosen. Report of Imperial Bureau of Fisheries. Scientific Investigations, vol. ii. 1913, pp. 17-30.) The flora of Wei-hai-wei, so far as can be judged from our meagre knowledge, evidently resembles in a general way that of Corea and S. Japan, though we can already see that it possesses distinct species.

The following is a list of Dr. Boyden's algae, together with the other specimens alluded to above:—

Letterstedtia japonica, *Holmes* in Journ. Linn. Soc. xxxi. p. 50.

Wei-hai-wei, Oct. 1910, *Boyden* 3.

Distrib. Japan.

Enteromorpha compressa, *Grav.* Alg. Brit. p. 180.

Wei-hai-wei, June 1913, *Boyden* 31.

Distrib. Cosmopolitan.

Chaetomorpha aerea, *Kütz.* Sp. 379.

Wei-hai-wei, Oct. 1910, *Boyden* 1.

Distrib. Probably cosmopolitan.

Sargassum Horneri, *Ag.* Sp. p. 38; Yendo Fucaceae Japan, pp. 74-80.

Macao and adjacent islands, 1830, *G. H. Vachel*.

Distrib. Japan, Corea, China.

Full notes on the various forms assumed by this species and on the synonymy are given by Yendo (l.c.).

S. Ringgoldianum, *Harv.* in Proc. Amer. Acad. Sci. iv. p. 327; Yendo l.c. pp. 146-150.

Prov. Chekiang 1889, *E. Faber*.

Distrib. Japan, Corea, Gulf of Tartary.

Yendo shows that *S. coreanum*, J.Ag. is merely a female plant of this species.

S. serratifolium, *Ag.* Sp. p. 86; Yendo l.c. pp. 81-85.

Sold at Pekin, *Bretschneider* 201.

Distrib. Japan, Corea.

The upper part of this species very closely resembles *S. tortile*.

S. tortile, *Ag.* Sp. p. 15; Yendo l.c. pp. 85-92.

Hongkong, *H. F. Hance* 1354.

Distrib. Japan, Corea, China.

S. hemiphyllum, *Ag.* Sp. 39; Yendo l.c. pp. 99-102.

Formosa, *Oldham*.

Distrib. Japan, Corea, China.

- S. glaucescens**, *J. Ag.* Sp. i. p. 306.
Hongkong, Feb. 1890, *C. Ford* 196.
Distrib. S. China.
Two rather young plants are doubtfully referred by Yendo to this species.
- S. cristaeifolium**, *Ag.* Sp. 13; Yendo l.c. p. 133.
Kelung, Formosa, *Oldham*.
Distrib. Ceylon, Phillipines, Japan.
- S. Decaisnei**, *J. Ag.* Sp. i. p. 329.
China, in herb. Berkeley.
Distrib. Red Sea.
- S. linifolium**, *Ag.* Sp. p. 18.
Hongkong, *H. F. Hance* 199.
Distrib. Mediterranean, Red Sea, Indian Ocean.
- S. Henslowianum**, *Ag.* in *J. Ag.* Sp. i. p. 315.
Macao, Hongkong, Feb. 1890, *C. Ford* 197.
Distrib. China, Cochin-China.
- S. confusum**, *Ag.* Syst. p. 301; Yendo l.c. pp. 106-112.
Wei-hai-wei, Oct. 1910, *Boyden* 15; June 1913, *Boyden* 28.
Distrib. Japan.
- Turbinaria trialata**, *Kütz.* Tab. Phyc. x. p. 24; Barton Syst. Struct. Turb. p. 218.
Macao, in herb. Hooker, sub *T. vulgaris*.
Distrib. General in warmer seas.
- Cystophyllum Thunbergii**, *J. Ag.* Sp. i. p. 233; Yendo l.c. pp. 114-119.
Wei-hai-wei, Oct. 1910, *Boyden* 16; June 1913, *Boyden* 29. Chefoo, 1861, *H. F. Hance*.
Distrib. Japan, Corea, China.
- Padina Commersonii**, *Bory*, Voy, Coquille no. 41 tab. 21.
Amoy, 1870, *R. Swinhoe*. Pratas Island, *Collingwood*.
Distrib. General in warmer seas.
- Echlonia cava**, *Kjellm* Jap. Lam. p. 273.
Sold at Pekin, *Bretschneider* 208.
Distrib. Japan.
Determined by Prof. Yendo, the structure of the thallus agreeing precisely with this species. The alga has not been previously recorded from China or Corea, and it is possible that the material may have been imported from Japan.
- Carpomitra Cabrerae**, *Kütz.* Phyc. gen. p. 343.
Wei-hai-wei, Oct. 1910, *Boyden* 10.
Distrib. S. England, S. Ireland, France, Spain, Mediterranean, Atlantic Islands, Japan, New South Wales, New Zealand.
- As shown above, the distribution of this alga is peculiar. It is very rare in Britain and nowhere

abundant, though in parts of New Zealand it appears to be not infrequent.

Desmarestia viridis, *Lamour.* Ess. p. 43.

Wei-hai-wei, June 1913, *Boyden* 31.

Distrib. General in north temperate waters of Europe, Asia, and America.

The records of *D. viridis* from the southern hemisphere refer to a distinct species, *D. Willii*, Reinsch.

Scytosiphon lomentarius, *J.Ag.* Sp. i. p. 126.

Wei-hai-wei, June 1913, *Boyden* 32; Hongkong, Feb. 1890, *C. Ford* 193.

Distrib. Widely distributed in cold and temperate waters of both N. and S. hemispheres.

The Hongkong specimen is a very fine plant with broad fronds; those from Wei-hai-wei are narrow, and agree with some sent recently to Kew from Japan by Prof. Matsumura. The narrow form is apparently fairly common in the East.

Endarachne Binghamiae, *J.Ag.* Anal. Alg. Cont. iii. p. 27, Formosa, *T. W. Watters* 139. Hongkong, Feb. 1890, *C. Ford* 194.

Distrib. Japan.

This plant has to be carefully distinguished from *Phyllitis fascia* and *Coilodesme bulligera*.

Hydroclathrus cancellatus, *Bory*, Dict. class viii. p. 419. Hongkong, *C. Wright*; Pratas Island 1867, *Collingwood*.

Distrib. General in warmer seas.

Gelidium Amansii, *Lamour.* in Kütz. Tab. Phyc. xviii. p. 16.

Formosa, *R. Oldham*.

Distrib. Japan, Corea.

This species is much more slender than, and very distinct from the Cape *G. cartilagineum* (L.) Gaill, with which it has been confounded. Dr. Yendo tells me that in Japan it extends from high-water line, where it occurs as a very short tufted form, down to 12 fathoms, when it is large and graceful and as much as $1\frac{1}{2}$ ft. long.

The fronds do not become terete, as do those of *G. cartilagineum*, but remain thin and permanently flattened. The stichidia occur as small spatulate branches.

G. latifolium, *Born.* in Born. et Thur. Not. Algol. p. 58.

Macao, in herb Hooker.

Distrib. Europe, N. Africa, Atlantic Islands, Japan.

Several dwarf plants of another *Gelidium*, evidently growing near high-water mark, were found by Dr. Boyden, but they are unfortunately too young to determine.

Euclidean spinosum, *J. Ag.* Sp. ii. p. 626.

Sold at Peking, *Bretschneider* 203. Formosa, teste Yendo in litt.

Distrib. Indian Ocean, Cape of Good Hope, tropical Australia, New Guinea, Japan.

E. papulosa, *Cotton & Yendo* in *Kew Bull.* 1914, p. 220.

Formosa, teste Yendo. Sold in China as "Hong-tsai."

Distrib. Red Sea, Somaliland, Japan, Sandwich Islands.

A full account of this algae is given in the *Kew Bulletin* (l.c.). In Japan, where it is used extensively, it is known as "Tosaka," and a certain amount is also exported annually to China.

Gracilaria confervoides, *Grev.* *Alg. Brit.* p. 123.

Wei-hai-wei, Oct. 1910, *Boyden*, 11. Hongkong, Feb. 1890, *C. Ford* 190.

Distrib. Probably cosmopolitan.

Apparently plentiful in the East.

G. corticata, *J. Ag.* Sp. ii. p. 602.

Macao, in herb. Hooker.

Distrib. Indian Ocean, China, Japan, Corea.

Hypnea seticulosa, *J. Ag.* Sp. ii. p. 446.

Hongkong, March 1890, *C. Ford* 195.

Distrib. Australia, China, Japan.

Delisea japonica, *Okam.* *Icones*, vol. i. No. 6, p. 139. *D.*

pulchra, *Okam.* *Exsicc.* No. 19 (non Mont.).

Tamsuy, Formosa, 1864, *R. Oldham*.

Distrib. Japan.

Laurencia papillosa, *Grev.* *Syn.* p. lii.

Amoy, *R. Swinhoe*; Takow, Formosa, *R. Swinhoe*.

Distrib. Mediterranean, Atlantic Islands, Red Sea, Indian Ocean, Phillipines, Japan, West Indies, Florida.

The West Indian species is apparently the same as the Mediterranean and Red Sea plant, but with such a difficult and little understood genus as *Laurencia* all records must be taken with caution.

Rhodomela subfusca, *C. Agardh*, Sp. i. p. 378.

Chefoo, May 1861, *H. F. Hance*.

Distrib. N. Atlantic and N. Pacific.

This species is listed with some reserve. As it is known from Japan, and has been recorded by Mrs. Gepp from Wei-hai-wei, it appears safe to refer the Chefoo specimen to *R. subfusca*, even though it appears to differ slightly from the more usual European forms.

Gloiosiphonia capillaris, *Carm.* in *Berkeley's Glean.* *Brit.*

Alg. p. 45.

Chefoo, May 1861, *H. F. Hance*.

Distrib. N. Atlantic (Europe and America), Japan.

Gloiopeltis tenax, *J. Ag. Alg. med.* p. 68.

"China," in herb. Hooker.

Distrib. Japan, Corea, China.

Grateloupia filicina, *Ag. Sp. i.* p. 223.

Wei-hai-wei, Oct. 1910, *Boyden* 4, 7.

Distrib. S. Europe, Indian Ocean, Japan.

Several specimens of a short, delicate, very pinnate form, evidently growing in rock-pools, were forwarded by Dr. Boyden. They closely resemble English specimens. Okamura's plant (*Alg. Jap. Exsicc.* 32), in the Kew copy at all events, is certainly distinct, and appears to agree with *G. subpectinata*, Holmes.

G. affinis, *Okam.* in *Bot. Mag. Tok.* vii. p. 100. *Gigartina affinis*, Harv. *Char. New Alg.* No. 31.

Wei-hai-wei, Oct. 1910, *Boyden* 8.

Distrib. Japan.

A variable plant as shown by Okamura (l.c.), and common in Japan on rocks near high-water line. Two small specimens collected by Dr. Boyden are with little doubt referable to this species.

Lithophyllum zostericolum, *Fosl.* in *Kgl. Norske vid Skrift.* 1900. No. 3, p. 5.

Wei-hai-wei, Oct. 1910, on leaves of *Zostera marina*, *Boyden* 13.

Distrib. Japan, Corea, N.W. America, California.

Corallina pilulifera, *Post. & Rupr.* *Illust.* p. 20.

Kelung, Formosa, Feb. 1882, *T. Watters*.

Distrib. Japan, Pacific Coast of N. America, Magellan, New Zealand.

XV.—DECADES KEWENSES

PLANTARUM NOVARUM IN HERBARIO HORTI REGII
CONSERVATARUM.

DECAS LXXXV.

841. **Meliosma Mannii**, *Lace* [Sabiaceae]; a *M. simplicifolia*, Roxb., inter alia inflorescentia densiore floribus majoribus recedit.

Arbor 6-15-metralis; ramuli primo puberuli, cito glabri, cortice primo brunneo vel fusco-brunneo mox cinereo-brunneo lenticellis pallidis majusculis conspicue notato obtecti. *Folia* simplicia, oblanceolata vel oblongo-oblanceolata vel rarius oblongo-elliptica, inferne in petiolum gradatim attenuata, apice subito acuminata, acuta, ad 21 cm. longa et 7.5 cm. lata, subcoriacea, supra viridia, nitida, infra pallida, glabra nisi pagina inferiore praesertim ad costam et in nervorum axillis pilis paucis instructa, nervis lateralibus utrinsecus 12-15 supra conspicuis subtus prominentibus, nervulis reticulatis pagina utraque conspicuis, margine integro paulo recurvo interdum undulato; petioli

1-2.5 cm. longi, supra canaliculati, basi incrassati, puberuli. *Paniculae* terminales, densiflorae, puberulae, inferne foliatae; flores albi, 3 mm. diametro, pedicellis 1-2 mm. longis pilis squamiformibus brunneis vel albidis tectis suffulti; bracteae bracteolaeque minutae, ciliatae. *Sepala* plerumque 4, inter se inaequalia, ciliolata. *Petala* glabra, tria exteriora orbicularia, concava, 2.5 mm. lata, duo interiora lanceolata, integra, circiter 2 mm. longa. *Drupa* obconoidea, basi obliqua vel subito contracta, usque ad 6 mm. diametro.

INDO-CHINA. Burma: Maymyo Plateau, 1050 m., a frequent tree on banks of streams, *Lace* 5282, 5371. Assam: Khasia Hills, *Mann* 260.

842. *Acacia Myaingii*, *Lace* [Leguminosae-Mimoseae]; ab affini *A. Harmandiana*, Gagnepain, paniculis glabris facile distinguenda.

Arbor parva; ramuli cinnamomei vel griseo-brunnei, parum costati angulati, lenticellis multis parvis notati, glabri, spinulis stipularibus circiter 2 mm. longis et spinis auctis (in ramulis foliosis) circiter 1.5 cm. longis, omnibus rectis glabris et purpureo-brunneis armati. *Folia* glabra, petiolo ad 2 cm. longo supra late haud alte canaliculato glabro suffulta, rhachi parum excurrente inter pinnae superiores glandula rotundata sessili saepius instructa; pinnae 1-2-jugae, usque ad 6.5 cm. longae, rhachilla magis minusve angulata sulcatave saepius excurrente et inter foliola duo superiora glandula parva sessili orbiculari instructa; foliola plerumque opposita, pinnae cujusque utrinsecus 3-6, oblique oblonga ellipticave, apice minute mucronata, interdum emarginata, basi latere altero anguste cuneata, altero rotundata truncatave, superiora inferioribus majora, 0.5-2.5 cm. longa, 0.2-1.2 cm. lata, coriacea, griseo-viridia, nervis pagina utraque conspicuis; petioluli 1 mm. longi. *Paniculae* terminales, 26 cm. longae, 23 cm. latate, glabrae, ramulis rigidis; flores lutei; capitula 5 mm. diametro, pedunculo 3-10 mm. longo medio vel fere ad medium bracteis in cupulam lobatam connatis ornato suffulta; bracteolae clavatae. *Calyx* 1 mm. longus, glaber, lobis 4-6 plerumque perbrevis et rotundatis apice incrassatis. *Corolla* 1.5 mm. longa, glabra, lobis 4-6 triangularibus acutis. *Stamina* circiter 50, fere 2 mm. longa, basi plus minusve connata. *Ovarium* glabrum. *Legumina* plana, suturis parum incrassata, apice rotundata, rarius obtusa, basi contracta, 6 cm. longa, 1 cm. lata, glabra, subcastanea, subnitida, breviter stipitata.

INDO-CHINA. Burma: Meiktila District; Menyo Reserve. 200 m., *Maung Tha Myaing* 238 (quoad spec. florifera). Wundwin Hills, *English* 21.

Burmese names, Tanaung-net or Tanaung-magyi (ex *Mg. Tha Myaing*); Su-ma-gyi (ex *English*).

The description of the fruit is taken from *English's* specimens the leaves of which agree with those on the flowering specimens of *Maung Tha Myaing*. The latter also collected fruiting specimens without leaves, and the immature pods measure up to 13 cm. long. In view of the good fruiting specimens collected by *English* it seems doubtful if these longer pods really belong to this species.

843. **Adina indivisa**, *Lace* [Rubiaceae-Naucleae]; ab *A. racemosa*, Miq., cui valde affinis, stipulis integris apice haud bifidis foliis capitulisque majoribus distinguenda.

Arbor usque ad 22 m. alta; ramuli primo puberuli, celerrime glaberrimi, cortice brunneo nitido lenticellato obtecti. *Folia* ovata, apice obtuse acuminata, basi parum cuneata truncatave, quoad magnitudinem egregie variabilia, usque ad 23 cm. longa et 13 cm. lata, chartacea, primo praesertim secus nervos puberula, in nervorum axillis pilosa, nervis lateralibus utrinsecus 9-12 pagina superiore conspicuis inferiore prominentibus nervulis transversis multis conspicuis junctis, margine integra parum undulata; petioli supra canaliculati, 3-6.5 cm. longi, puberuli; stipulae triangulares, acutae, 9 mm. longae, luteo-brunneae, fugaces. *Capitula* in racemos terminales simplices inferne foliatis disposita, pedunculis 2.5-7 cm. longis puberulis suffulta, odiose graveolentia; bracteolae filiformes, minutae, pubescentes. *Receptaculum* pilosum. *Calyx* 2 mm. longus, lobis perbrevibus rotundatis utrinque tomentosus. *Corolla* 8 mm. longa, utrinque puberula; tubi pars tertia superior parum subito inflata; lobi circiter 1 mm. longi, apice fere rotundati, ciliati. *Filamenta* circa 1 mm. longa. *Stylus* glaber, stigmate clavato.

INDO-CHINA. Upper Burma: Maymyo Plateau, 1050 m., *Lace* 5262, 5852, 6151. Myitkyina, Loihpun, 1230 m., *Maung Po Kyaw* 34.

844. **Linociera Beccarii**, *Stapf* [Oleaceae]; affinis *L. macrocarpae*, Knobl., sed bracteis primariis foliaceis reniformibus, fructibus 8-costatis vertice truncatis, costis 2 magis prominulis distincta.

Arbor (?) glabra, ramulis valde compressis lenticellis albidis. *Folia* oblanceolata, subacuminata, basi longe attenuata, 15-22 cm. longa, 6-7.5 cm. lata, coriacea, exsiccando supra fusca, subtus olivacea, nervis lateralibus angulo lato interdum subrecto patentibus sub margine subito prorsus duetis venis nullis vel subnullis; petiolus 2-3 cm. longus, subgracilis. *Flores* ignoti. *Infructescentia* inferne bracteis foliaceis reniformibus 7-8 mm. longis 1-1.2 cm. latis instructa. *Fructus* ellipsoidei, fere 3 cm. longi, circiter 2 cm. lati, 8-costati, costis obtusiusculis, 2 superne magis prominentibus trans verticem truncatum fere concurrentibus, epicarpio fusco, albido-lenticellato.

SUMATRA. Province Padang: Ajer mantjoer, 360 m., *Beccari* 826.

845. **Linociera elaeocarpa**, *Stapf* [Oleaceae]; affinis *L. macrocarpae*, Knobl., sed foliis obovatis vel obovato-oblongis apice rotundatis vel obtusis brevissime acuminatis in petiolum longe decurrentibus, nervis lateralibus circiter 12, fructu dactyliformi apice acutiusculo, pericarpio osseo distincta.

Arbor (?) glabra, ramulis compressis parce lenticellatis pallide fuscis. *Folia* obovata vel obovato-oblonga, apice rotundata vel brevissime obtuso-acuminata, basi longe in petiolum crassum attenuata, 20-22 cm. longa, 7-9 cm. lata, coriacea, supra exsiccando fusca, subtus olivacea, nervis lateralibus utrinque circiter 12, angulo lato patentibus, venis nullis;

petiolus 1-1.5 cm. longus. *Flores* ignoti. *Infructescentia*, ut videtur, brevis, fructibus demptis ad 5 cm. longa, pedicellis crassis. *Fructus* oblongo-elliptici, apice acutiusculo, 4 cm. longi, 2 cm. diametro, epicarpio laevi fusco-rubesciente, endocarpio osseo, pericarpio toto 5 mm. crasso.

BORNEO. Sarawak: without precise locality, *Beccari* 725.

846. **Linociera evenia**, *Stapf* [Oleaceae]; affinis *L. insigni*, Clarke, sed foliis minoribus, ob nervos plane inconspicuos fere eveniis obovato-lanceolatis apiculatis, alabastris minus acutis distincta; a *L. macrocarpa* foliis et calycis segmentis anguste triangulari-lanceolatis recedit.

Arbor (?) glabra, ramis cortice albido tectis, ramulis hornotinis sursum compressis castaneis. *Folia* obovato-lanceolata, apiculata, basi cuneato-attenuata, 8-15 cm. longa, 4-5 cm. lata, coriacea, exsiccando supra subtusque subconcoloria, olivacea vel subcastanea, costa subtus prominente obtusa supra anguste canaliculata, nervis venisque plane inconspicuis; petiolus 1.5-1.8 cm. longus. *Inflorescentiae* pedunculis gracilibus ad 4 cm. longis suffultae, superne puberulae; bracteae infimae lineares, obtusae, ad 3 mm. longae; pedicelli vix 1 mm. longi. *Flores* pauci; alabastra obtusiuscula. *Calyx* 1 mm. longus; sepala ovata, acuta, albo-pilosula. *Corolla* 2-5 mm. longa; tubus subnullus; segmenta oblonga, subacuta; alabastrum obtusiusculum. *Antherae* 2 mm. longae. *Fructus* ignotus.

BORNEO. Sarawak: without precise locality, *Beccari* 3301.

847. **Pimelea tenuis**, *Scott* [Thymelaeaceae-Euthymelaeaceae]; a *P. angustifolia*, R.Br., foliis brevioribus latioribusque, involucri phyllis obtusioribus, perianthii tubo tenuiore, lobis minoribus recedit.

Fruticulus superne virgato-ramosus. *Caulis* leviter rugosus, cinereo-fuscus; ramuli numerosi, glabri (in foliorum axillis pilis paucis albidis sericeis minutissimis exceptis), pallido-fusci, internodiis 1-1.8 cm. longis. *Folia* opposita, sessilia, lanceolata, ad basin attenuata, apice obtusa, 8-9 mm. longa, 2-2.5 mm. lata, marginibus incurvata vel interdum concava et caulem amplectantia, coriacea, glauco-viridia, costa subtus subdistincta. *Capitula* plurima, multiflora, globosa, suberecta demum nutantia, elegantia, 1-1.3 cm. diametro. *Involucri* phylla 4 ovata vel suborbicularia, apice obtusa, 4 mm. longa, 4 mm. lata, extus glabra, intus praecipue in medio pilis albidis sericeis induta, viridia, marginibus alba, costa subdistincta alba. *Perianthii* albi tubus tenuis, pilosus, super ovarium articulatus, super articulationem 0.9-1 cm. longus, 0.75 mm. latus; lobi plus minusve oblongi, apice rotundati, 2-2.5 mm. longi, 1 mm. lati. *Stamina* tubi fauce inserta, lobos aequantia; filamenta tenuissima, 2 mm. longa; antherae oblongae, 0.75 mm. longae. *Ovarium* villosum, 2.5 mm. longum, pilis 1 mm. longis; stylus stamina longitudine aequans; stigma capitatum, glabrum.

WEST AUSTRALIA. Nangeenan, *Stoward* 113.

Pritzel 1008 is probably a form of this species; its upper leaves agree with those of the type, but the lower ones are linear. It is

to be noted, however, that only the leaves on the young wood are present in *Stoward* 113. In floral characters Pritzels specimen agrees with the type.

var. **longistyla**, *Scott*, foliis majoribus, perianthio paulum minore, stylo exserto a typo recedit.

Folia conferta, interdum minutissime apiculata, internodiis longiora, majora, 0.8-1.2 cm. longa, 2-2.75 mm. lata, marginibus leviter incrassata. *Involucris* phylla minus obtusa, pallidiora, majora, 6 mm. longa, 5 mm. lata, venis distinctioribus. *Perianthii* tubus brevior, super articulationem 0.75 cm. longus; lobi oblongi, apice rotundati, 2-2.5 mm. longi. *Filamenta* tubi fauce inserta, 0.5 mm. longa; antherae lineares 0.5-0.75 mm. longae. *Ovarium* 2.5 mm. longum, pilis 2 mm. longis; stylus exsertus, perianthio 1-2 mm. longior.

WEST AUSTRALIA. Victoria Desert, Camp 57, *R. Helms* (Elder Exploring Expedition).

Some of the differences noted above, e.g., the larger leaves, may be due to the age of this plant, which appears to be only in the first or second year of its growth. Perhaps the short filaments and exserted style should rather be taken as a case of heterostyly—a phenomenon not unknown in the Thymelaeaceae (cf. "The Different Forms of Flowers on Plants of the Same Species," by Ch. Darwin, p. 114).

848. ***Brodiaea recurvifolia***, *C. H. Wright* [Liliaceae-Allieae]; *B. sellowianae*, Baker, affinis, segmentis perianthii angustioribus differt.

Bulbus ovoideus, usque ad 1 cm. diametro. *Folia* synanthia, linearia, obtusa, recurvata, plana, glabra, marginibus minutissime denticulatis, 6 cm. longa, 2.5 mm. lata. *Pedunculus* 2 cm. longus, uniflorus, gracilis; spatha 18 mm. longa, membranacea, biloba; pedicellus 1-3 mm. longus. *Perianthium* album vel dilute luteum; tubus 1.5 cm. longus; lobi elliptici, obtusi, 6 mm. longi, 3 mm. lati, uninerves. *Antherae* sagittatae, 3 mm. longae. *Staminodia* oblonga, 1.5 mm. longa. *Ovarium* subglobosum, loculis 10-12-ovulatis; stylus 1.5 cm. longus; stigma breviter trilobum.

URUGUAY: Montevideo, *Arechavaleta* 19, Canelan Chico, *Berro* 5898.

This is quite a diminutive species of *Brodiaea* and has the appearance of a dwarf *Zephyranthes*.

849. ***Fimbristylis* (*Trichelostylis*) *Allenii***, *Turrill* (Cyperaceae-Scirpeae); *F. quinqueangulari*, Kunth, affinis, sed gracilior. foliis angustioribus brevioribusque, glumis apice rotundatis apiculatis margine membranaceis ciliolatis recedit.

Planta annua, erecta, gracilis, glabra, culmis 3 dm. altis, usque ad 3 cm. supra imam basem vagina aphylla tectis. *Folia* omnia basalia, anguste linearia, acutissima, 5-7 cm. longa, 1 mm. lata, margine leviter scabrida, glabra, plus minusve recurva. *Inflorescentia* multispiculata, laxa, circiter 6 cm. longa et 5 cm. diametro; bracteae valde vaginantes, 3 mm. longae; spiculae cylindrico-ellipsoideae, multiflorae, 5 mm. longae. 2 mm. dia-

metro. *Glumae* late oblongo-ovatae, apice rotundatae, apiculatae, 2.5 mm. longae, 2 mm. latae, margine membranaceae, ciliolatae. *Stamina* 3, filamentis 3.5 mm. longis, antheris linearibus 1.75 mm. longis. *Ovarium* obovoideo-cylindricum, glabrum; stylus ramis tribus 1 mm. longis inclusis 2.25 mm. longus, dense hispidus. *Nux* obovoidea, indistincte trigona, 0.7 mm. alta, usque ad 0.5 mm. diametro, nigro-glauescens.

AUSTRALIA. Northern Territory; near Darwin, wet land, C. E. F. Allen 170.

850. **Fimbristylis (Trichostylis) compacta**, *Turrill* (Cyperaceae-Scirpeae); *F. capitatae*, R.Br., affinis, sed foliis latoribus longioribus margine ciliatis, inflorescentiis amplioribus, nucibus majoribus distinguenda.

Planta erecta, culmis usque ad 6.5 dm. altis striatis inferne glabris superne scabridulis et leviter pubescentibus basem versus vaginis aphyllis tectis. *Folia* omnia basalia. linearia, apice acuta, usque ad 2.8 dm. longa et 3 mm. lata, margine valde cartilaginea, ciliata. *Inflorescentia* e spiculis in capitula aggregatis constituta, capitulis usque ad 9 plus minusve laxe dispositis; spiculae breviter ovoideae, 5 mm. longae, 3.5 mm. diametro. *Glumae* late oblongae, apice rotundatae, apiculatae vel inferiores arista 1 mm. longa e dorso oriente instructae, 3 mm. longae, 2.5 mm. latae, ciliatae, superne brunneo-maculatae. *Stamina* 3, filamentis 4 mm. longis, antheris linearibus 1.5 mm. longis apice breviter coronatis ciliatisque. *Ovarium* cylindrico-obovoideum; stylus ramis tribus 2.5 mm. longis inclusis 4 mm. longus, inferne hispidus. *Nux* late obovoidea, inconspicue triangularis, 0.75 mm. longa, 0.75 mm. diametro, superficie tota minute tuberculata, fere alba.

AUSTRALIA. Northern Territory; in swamp near Darwin, C. E. F. Allen 174; in gorge Pine Creek, near Darwin, C. E. F. Allen 103.

XVI.—MISCELLANEOUS NOTES.

MR. J. AIKMAN and MR. A. D. COTTON, F.L.S., Assistants, Second Class, in the Royal Botanic Gardens, Kew, have been promoted to the grade of Assistant, First Class, with effect from April 1.

We learn that MR. W. W. PETTIGREW, formerly a member of the gardening staff of the Royal Botanic Gardens, and lately Chief Officer of Parks and Open Spaces, Cardiff, has been appointed Superintendent of Parks under the Manchester Corporation, and that MR. A. A. PETTIGREW, also formerly a member of the gardening staff of the Royal Botanic Gardens, has been appointed Chief Officer of Parks and Open Spaces, Cardiff, in succession to his brother.

Retirement of Mr. G. Masee.—By the retirement of Mr. G. Masee on March 31st, under the age limit, the Herbarium loses

one of the best known and most active members of its staff. Mr. Massee joined the Kew staff in 1893, when he was appointed Principal Assistant (Cryptogams), which post became later one of the "First Class Assistantships," so that he has the distinction of having been a senior officer during the whole of his official career.

A Yorkshire man by birth, Mr. Massee left his native village of Scampston when about 10 years old, for the city of York, in order to complete his education. Besides adventure, two things attracted him, namely, painting and botany. One may safely say that in all three he achieved success. After some exciting experiences in the West Indies and South America he settled down to more serious work at home, returning to his old hobby, botany, and specialising on fungi and plant diseases. For some years he worked privately at Kew, and in 1893 succeeded Dr. M. C. Cooke in charge of the Cryptogamic Department in the Herbarium.

Previous to his appointment Mr. Massee had published several important morphological and systematic papers, and in 1891 his book *British Fungi, Phycomycetes and Ustilagineae* appeared, whilst the following year saw the production of his *Monograph of the Myxogastres*, in which his skill as an artist, already known through his work in Spruce's *Hepaticae Amazonicae et Andinae*, became further evident. In the same year the first volume of his *British Fungus Flora* was issued. The four volumes which were published, at once became, and have remained, a standard work, and it is much to be regretted that it was found impossible to issue the remaining parts.

Previous to 1899 there were only two books on plant diseases available for English students, namely, Mr. Worthington G. Smith's *Diseases of Field and Garden Crops* and Dr. William G. Smith's very useful translation of von Tubeuf's *Pflanzenkrankheiten*. The former was limited in its scope, and the latter scientific rather than economic. Mr. Massee attacked the subject from the practical standpoint, including at the same time a wide range of host plants, and the appearance of his work, *A Text-book of Plant Diseases*, in 1899, marks an epoch in the history of the subject in this country. The book was hailed with delight both by growers and botanists, and a second edition was issued in 1903. Through it the author came into touch with pathologists in all parts of the world, a fact which incidentally led to a heavy increase of work in the Cryptogamic Department. Many papers and articles followed, and in 1910 his other well-known book, *Diseases of Cultivated Plants and Trees*, was issued. In 1902 he received the V.M.H. of the Royal Horticultural Society.

In spite of his activity in the field of pathology Mr. Massee found time to produce books on systematic mycology, a very concise but useful synopsis of European Agaricaceae appearing in 1902, and nine years later the less severely technical volume, *British Fungi and Lichens*. In 1906 he published a more general work entitled *A Text Book of Fungi*, and in 1913, in conjunction with his daughter, Miss Ivy Massee, the volume *Mildews, Rusts and Smuts*.

For an idea of Mr. Massee's personal characteristics no better

sketch could be wished than the graphic article which appeared in the *Journal of the Kew Guild* for 1908. With regard to his literary labours he knows well what it is to burn the midnight oil, feeling, he always says, in his best mood for writing when every one else has retired. One is perhaps most impressed with his extraordinarily wide knowledge of fungi, and his intuition in detecting an awkward and deceptive specimen, though one is continually struck afresh with the excellence of his bold and beautiful drawings. Mr. Massee has a keen sense of humour, and to be in his company relieves even systematic botany of all dullness. The scathing denunciations in which he is apt to indulge are not meant to be taken seriously, and those who know him well welcome his candid and often pungent criticism. A weak spot in an argument is sure to be exposed, and as Mr. Massee attacks each branch of botany in turn it is probable that many of the younger Kew botanists owe him a secret debt of gratitude. He will be much missed by all his colleagues, and he takes with him their best wishes for long continued health and happiness.

A. D. C.

WILLIAM GRANGER.—With the death of Mr. William Granger at Richmond on the 12th of March, at the ripe age of 86 years, there has passed away one of the oldest and most respected servants of the Royal Gardens. Granger entered the Kew service so long ago as June, 1850, and even before that date he had served the State for eight years in the Royal Navy—a training that evidently gave him a life-long character for neatness and accuracy in all that he undertook, a proof of which is shown by the various posts he held, such as office keeper, clerk to the curator, and finally storekeeper. For some time a part of his duty was to check the men's time as they entered and left the Gardens, either in the early morning or at meal times, and a kindly given warning word from Granger as to any slackness or irregularity as to time, was always effectual, as the men realised that such a warning was given only for their own welfare. Besides this the interest and sympathy he always had for them in times of affliction had a marked effect, and cannot be better expressed than by quoting the following paragraph from a notice of his retirement, in the *Journal of the Kew Guild* for 1893. "It is difficult adequately to express the feeling with which he has always been regarded by Kew men; that feeling, however, is one of deep respect and esteem, it would scarcely be too much to say, of affection. Only those who have lived and worked at Kew can appreciate the peculiar position he has occupied in the establishment, and the great moral influence he exerted over the men, many a new-comer having had reason to be thankful for his advice and encouragement."

The neatness and order of his work generally was reflected in his personal appearance and home life in one of the houses on the north side of Kew Green, so that the rooms he let were seldom or never empty. When the writer of this notice arrived at Kew in 1858, he found Mr. Allan Black, Curator of the Herbarium.

residing there, and the rooms were afterwards occupied by Mr. Donald McLeod, Assistant Curator of the Gardens. Granger retired from service at Kew under the age limit, in 1893, receiving a small pension. For many years he held the position of parish clerk at Kew Church.

J. R. J.

Pathological Laboratory.—The work of the Royal Botanic Gardens, Kew, has been widened by the establishment of a Pathological Laboratory for investigation and research into diseases of plants caused by fungi.

Two cottages on Kew Green, formerly known as Gumley and Chestnut Cottages, have been acquired and fitted up as a research laboratory. The cottages now united were originally in connection, and were used, it is believed, as residences for ladies of the bedchamber when Queen Charlotte occupied Kew Palace. Some of the ceilings are interesting examples of XVIIIth century plaster work.

Presentations to Museums.—The following miscellaneous specimens have been received in addition to those previously recorded in the Bulletin:—

Messrs. James Veitch and Sons, Coombe Wood.—Section of wood of *Davidia involucrata*.

Imperial Commissioner of Agriculture for the West Indies.—A collection of photographs of West Indian Trees, also views in the Botanic Gardens, Antigua and St. Vincent.

Mr. R. N. Rogers, Carwinion, Falmouth.—Sections of wood of *Thuja plicata* and naturally grafted branches of Holly.

The Earl of Ducie, Tortworth Court, Gloucester.—Specimens of cladoptosis of branches of *Quercus Mirbeckii*.

Director, Botanic Gardens, Brisbane.—Section of stem of *Millettia megasperma*.

Mr. J. Gribble, Penzance.—Section of stem of *Eucalyptus Globulus*.

Mr. W. Schway Thwin, Moulmein, Burma.—Specimen of dried plant and oil of *Cymbopogon Nardus*.

Forestry Officer, Georgetown, British Guiana.—Ten photographs of British Guiana Palms, &c.

Curator, Botanic Gardens, Dominica.—Sample of Chicle Gum extracted from a tree of the "Naseberry" or "Sapodilla Plum" (*Achras Sapota*).

Director, Botanic Gardens, Singapore.—Sections of wood of *Calophyllum ferrugineum* and *Castanopsis Hullettii*.

Messrs. William Duncan and Son, Buckie.—Turned articles made of the wood of the "Yew" (*Taxus baccata*).

St. Vincent Permanent Exhibition Committee.—Seventeen photographs descriptive of the Cotton Industry of St. Vincent.

Mr. Donald Gunn, London, W.—Walking sticks of *Robinia Pseudacacia* and of "Square Bamboo" (*Bambusa quadrangularis*).

Mr. C. Garrett, Bedford Park, W.—Abnormal fruit of "Orange" (*Citrus Aurantium*).

Mr. C. S. Persichetti, Westminster.—Stems of *Spartium junceum* and fibre extracted from the same.

Curator, Botanic Station, Seychelles.—Photographs of germinating "Coco de Mer" (*Lodoicea sechellarum*).

Mr. J. Campbell, Raheny, Ireland.—Nest of baskets made by Malacca Malays from the split leaves of a species of *Pandanus*.

J. M. H.

The genus *Honckenya*.—When describing the monotypic African tiliaceous genus *Cephalonema* for Hooker's *Icones Plantarum* (t. 3002), the writer had to examine the species of *Honckenya* in order to discover the characters distinguishing the two genera. These may be summarized as follows:—

Honckenya. Flowers purplish; capsule terete, bristly all over, the loculi divided by incomplete transverse septa between the seeds; tertiary nerves of the leaves not very regular.

Cephalonema. Flowers yellow; capsule winged, bristly on the margins of the wings, the loculi not divided; tertiary nerves of the leaves straight and parallel.

Three species of *Honckenya* have been described. *H. ficifolia*, Willd., the type of the genus, is common in West Africa, from Senegambia to Angola, and extends eastwards to Uganda. It is an important indigenous fibre plant.* Good figures of it are given in Delessert, *Icones*, vol. v. t. 1, and in *Bot. Mag.* t. 7836. The anthers are H-shaped, the lobes being free at both ends and joined for a short distance in the middle by the connective.

The other two species are comparatively little known. *H. minor*, Baill.,† was based on a specimen collected at Axim, on the Gold Coast, and preserved in the Paris Herbarium. It is not represented by authenticated specimens in the Kew Herbarium. According to Baillon, it resembles certain species of *Triumfetta* in general appearance and in the fruit, and differs from *H. ficifolia* in the smaller size of all its parts, the presence of relatively long simple hairs on the leaves in addition to stellate ones, and in the ellipsoid anthers. Mature seeds are not known.

H. parva, K. Schum.,‡ was based on specimens collected at Monrovia, Liberia, by E. H. L. Krause, and is represented at Kew by a portion of the type as well as by specimens collected in Sierra Leone by Scott Elliot and Smythe. According to Schumann it resembles *Triumfetta procumbens*, Forst., in habit, and differs from *H. ficifolia* in the small leaves clothed with simple hairs on both surfaces, and the tuberculate seeds. The young leaves have short stellate hairs in addition to long simple ones, and the anthers are elliptic-oblong in outline (*Scott Elliot* 3915).

Honckenya minor and *H. parva* thus appear to differ in the same characters (as far as these are known) from *H. ficifolia*; and since no material differences have been discovered in the descrip-

* Kew Bull., Add. Ser. ix. p. 107.

† *Adansonia*, vol. x. p. 183 (1872).

‡ *Engl. Jahrb.* vol. xv. p. 115 (1892).

tions of *H. minor* and *H. parva*, it is possible that they are conspecific.

T. A. S.

***Lepidium oxytrichum*.**—In 1852 F. Mueller gave the name *Lepidium papillosum* to a new species collected by him in South Australia.* This was characterised by a dense clothing of white clavate papillae on the stem and branches, and by a narrow straight-sided sinus at the apex of the silicle. In a second account published in 1879 he described the stem and branches as being covered with very short spreading turgid, almost vesicular hair.† *L. papillosum* is represented in the Kew Herbarium by a type-specimen from Crystal Brook, South Australia, and by two plants collected in New South Wales and South Australia by Cunningham and Wheeler respectively.

The plants described by Thellung‡ under this name belong to a distinct species which has the stem and branches densely hirsute with slender linear-subulate hairs, and a triangular sinus at the apex of the silicle. For this species the name *Lepidium oxytrichum* is now proposed. Its synonymy and distribution are as follows:—

***Lepidium oxytrichum*, Sprague, nom. nov. *L. papillosum*, Thellung, Die Gattung Lepidium, pp. 276, 288 (1906), non F. Muell.**

AUSTRALIA. South Australia: between Stokes' Range and Cooper's Creek (mixed with *L. papillosum*), Wheeler; Mt. Lyndhurst, *Mar Koch* 199, 200. Western Australia: without precise locality, *Ince*.

Thellung also records the species from "New South Wales: Mt. Brown, *Walter*."

The distribution of *L. papillosum*, F. Muell., is Queensland,§ New South Wales, Victoria,|| and South Australia.

T. A. S.

***Melochia ulmifolia*.**—Two species of this name are recorded in the Index Kewensis as having been published in 1842, one a native of Guiana and Northern Brazil, described by Benth in Hook. Journ. Bot. vol. iv. p. 129, the other a native of Central Brazil, described by St. Hilaire and Naudin in Ann. Sc. Nat., Sér. 2, vol. xvii. p. 36. Schumann, when monographing the *Sterculiaceae* of Brazil in 1886, retained the name *Melochia ulmifolia* for the latter, and re-named Benth's species *M. Benthani*.¶ R. E. Fries in his Studies on American Columniferae, pointed out that Benth's species had been described under the names *Riedleia ramuliflora*, Miq., in 1847, and *Riedleja? dichotoma*, Turcz., in 1858; and he accordingly pro-

* Linnaea, vol. xxv. p. 370.

† Native Plants of Victoria, p. 37.

‡ Die Gattung Lepidium, pp. 276, 288 (1906).

§ Bailey, Queensl. Fl. p. 52.

|| Native Pl. Victoria, p. 37.

¶ Mart. Fl. Bras. vol. xii. pars 3, p. 40 (1886).

posed for it the new combination *Melochia ramuliflora*, R. E. Fries.*

Both the above-mentioned periodicals were, however, published in monthly parts; and Bentham's species appeared in the Journal of Botany for August, 1841,† whereas St. Hilaire and Naudin's was published nearly a year later in the Annales des Sciences Naturelles for July, 1842.‡

The name *Melochia ulmifolia*, Benth., should therefore be retained, and a new one is required for *M. ulmifolia*, St. Hil. and Naud. The name *Melochia Gardneri* is now proposed for it.

Melochia Gardneri, *Sprague*, nom. nov. *M. ulmifolia*, St. Hil. & Naud. in Ann. Sc. Nat. Sér. II. vol. xvii. p. 36 (1842); K. Schum. in Mart. Fl. Bras. vol. xii. pars 3, p. 36; non Benth.

BRAZIL. Goyaz: in woods on the Serra de Santa Brida, April 1840, *Gardner* 3608.

M. Gardneri is described by the collector as a shrub, 6-8 ft. high.

T. A. S.

Botanical Magazine for February.—The plants figured are *Tillandsia Regina*, Vell. (t. 8596); *Mormodes tigrinum*, Rodr. (t. 8597); *Rhododendron moupinense*, Franch. (t. 8598), and *Eugenia uniflora*, Linn. (t. 8599). The *Tillandsia* has been in cultivation for more than half a century and has borne a variety of names including *Vriesia Regina*, Antoine, and *V. Glazioviana*, Lem. It is a native of the forests of the provinces of Rio de Janeiro and San Paulo in Southern Brazil, and as known in gardens its flowers are variable in colour, sometimes being white, sometimes yellow, while in some instances there is a change from white to yellow during the flowering period. Its leaves, arranged in a large rosette, are $3\frac{1}{2}$ – $4\frac{1}{2}$ feet long and 3–4 inches broad, and the densely bracteate peduncle is $3\frac{1}{2}$ feet high, bearing a panicle of about the same length. The plant from which the material for the figure was obtained was grown in the Mexican section of the Temperate House at Kew, where it flowered in May, 1912, being then about thirty years old. It died soon afterwards.

Mormodes tigrinum is striking in the colour of its medium-sized flowers of which the sepals and petals are densely blotched with purple on a paler ground, while the lip is yellow and bears numerous brown spots. The species inhabits forests in the region of the Upper Amazon, and was first introduced to cultivation about 1890 by Messrs. Sander and Sons, in whose establishment at St. Albans a plant flowered in that year. The Kew plant, which flowered in February, 1914, and which furnished the material for the figure, was purchased from Messrs. Sander, who received it in a recent importation from Mr. Forget. The genus is closely allied to *Catasetum*, from which it may be distinguished by having hermaphrodite flowers and a lip which is obliquely twisted to one side.

* Svensk. Vet. Akad. Handl., N.S., vol. xlii. No. 12, p. 11 (1903).

† See foot of p. 113.

‡ See foot of p. 17.

The *Rhododendron* is a Western Chinese species and grows at altitudes of 6000–10,000 feet above sea-level. Originally found by the late Abbé David in the neighbourhood of Moupine, Szechuan, in 1870, its appearance in the living collections at Kew results from seeds received from the Arnold Arboretum for which they were collected in 1908 by Mr. E. H. Wilson, who met with the species growing as an epiphyte, often on evergreen oaks and other broad-leaved trees, on Mount Omi and on neighbouring mountains. It is of dwarf habit, suitable for the rock-garden, and flowers when only a few years old. Amongst the species of the section *Lepidorhodium* it is easily recognised by the subverticillate somewhat cordate glandular leaves, the large leafy calyx, the black-pilose twigs and petioles, the large white corollas spotted with red on the inside of the upper part of the tube, and by the large carmine anthers.

The *Eugenia*, under the name of *Plinia pedunculata*, Linn., was illustrated in the Botanical Magazine as long ago as 1799 (t. 473), but that illustration does not show the edible brightly coloured fruits, which are not always obtained on cultivated plants. It appears to have been grown in the Apothecaries Garden, Chelsea, in 1759. The species is a native of tropical South America, and is cultivated in most warm countries. As *Eugenia Michellii*, Lamk., the plant from which the material for the figure was prepared was presented to Kew by the Director of the Jardin Colonial, Paris, and grown in the Palm House; it fruited freely in May, 1914.

Botanical Magazine for March.—The plants figured are *Cirrhopetalum Fletcherianum*, Rolfe (t. 8600); *Rhododendron stamineum*, Franch. (t. 8601); *Pinguicula gypsicola*, T. S. Brandegee (t. 8602), and *Lotus campylocladus*, Webb et Berth., forma *villosior*, Sprague (t. 8603).

The *Cirrhopetalum* is a recent introduction from New Guinea, whence it was first imported to England by Messrs. Hugh Low & Co., of Enfield. A plant acquired by the Rev. J. C. B. Fletcher, Mundham Vicarage, Colchester, was exhibited last year at a meeting of the Royal Horticultural Society under the name of *Bulbophyllum Fletcherianum*. The drawing was made from a water-colour sketch of the plant and a single flower presented by Mr. Fletcher, and from a living plant lent to Kew by Messrs. Stuart Low & Co. It is a remarkable species, having long pendulous leaves resembling those of *Phalaenopsis Schilleriana* and large flowers suffused and blotched with purple.

Rhododendron stamineum belongs to the small section *Chonias-trum*, the species of which are distinguished by having their flowers produced from axillary buds, which are crowded at the ends of the branches. With this character are always found eglandular persistent leaves and long funnel-shaped corollas. From its allies, *R. stamineum* may be recognised by its long, far-exserted stamens. For its introduction to cultivation we are indebted to Messrs. James Veitch & Sons, who received it in 1900 from their collector, Mr. E. H. Wilson, by whom it was met with in rocky shady ravines in Western China. Its leaves are ovate-

lanceolate, 2-4 inches long, and the fragrant flowers, white with some yellow at the base of the upper lip, are arranged in loose clusters. The material used for the figure was furnished by Mr. J. C. Williams, in whose fine garden at Caerhays Castle, Gorran, Cornwall, a plant flowered in April, 1914.

The Mexican *Pinguicula* has rather showy purple flowers, and is particularly interesting owing to the variability of its leaves. As is usual in the genus these are in a basal rosette. At the time of flowering they are linear, two inches or so in length, and are widened at the base. After the flowering season the long leaves gradually die off centripetally, and at the crown a compact rosette, about $\frac{3}{4}$ inch across, resembling those of some species of *Semprevivum*, develops and entirely replaces the rosette of long leaves. The small rosettes persist through the winter and are succeeded in the same manner by the rosettes of long leaves. This *Pinguicula* was discovered by Dr. Purpus in 1910, growing on wet gypsum rocks at Minas de San Rafael, in the State of San Luis Potosi, and the Kew plant was obtained by purchase in 1912 from Mr. R. Graessner, of Perleberg.

Lotus campylocladus is a compact-growing herb about a foot high with silvery leaves and pleasing yellow flowers, marked with red streaks and arranged in rather long-stalked umbels. It is a native of the Canary Islands. The form figured, raised at Kew from seeds presented by Dr. G. V. Perez, of Orotava, differs from the type in having stems, leaves and calyces spreading-villous, and in having longer leaflets. The plant does not promise to be hardy at Kew.

Botanical Magazine for April.—The plants figured are *Thunbergia Gibsonii*, S. Moore (t. 8604); *Rhododendron Davidsonianum*, Rehder & Wilson (t. 8605); *Primula Miyabeana*, Ito & Kawakami (t. 8606); *Acanthopanax leucorrhizum*, Harms (t. 8607) and *Iris Urumovii*, Velenovsky.

The *Thunbergia* is a native of tropical East Africa, where it grows at an elevation of 8000 ft. The limb of the corolla is a deep orange colour and of a waxy consistence, and the species is thereby distinguished from its nearest ally, the well-known *T. alata*, Boj. The plant was exhibited in 1913 at an exhibition of the Royal Horticultural Society by Mr. W. van der Weyer, Corfe Castle, Dorset, who was responsible for its introduction to this country.

Rhododendron Davidsonianum is one of the new Chinese species brought into cultivation through the efforts of Messrs. E. H. Wilson and J. Veitch & Sons, having been raised at Coombe Wood from seeds collected by Wilson in 1903-4. It occurs plentifully in Western Szechuan and is apparently most nearly allied to *R. ambiguum*, Hemsl., from which it may be distinguished by the more elegant habit, smaller leaves and differently coloured flowers.

Primula Miyabeana belongs to the *Candelabra* section of the genus, the members of which are natives of eastern and south-eastern Asia. They live in moist meadows and are distinguished by their rosettes of leaves like the primrose and tall flower scapes with superimposed tiers of flowers. Our species belongs to the

sub-section with purple flowers, and is nearly allied to *P. Poissoni*, Franch., but is readily distinguished from this and all other members of the section *Candelabra* in having the calyx farinose within. *P. Miyabeana* is endemic in Formosa, and was raised at Kew in 1913 from seed collected by Mr. W. R. Price on Mount Morrison, Formosa, at 7000 ft. elevation.

The Araliad which forms the subject of t. 8607 was originally described by Prof. Oliver from specimens discovered by Prof. A. Henry in Hupeh, Central China. Mr. Wilson again found it, and through his agency its introduction to cultivation is due to Messrs. J. Veitch & Sons. The species was first referred to *Eleutherococcus*, but Dr. Harms has placed it in the older genus *Acanthopanax*, since there are no grounds for separating the two genera. According to Henry the bark of the roots is used as a drug in China.

Iris Urumovii receives its name from its discoverer, Prof. J. K. Urumov, by whom it was found at Eski Dzumaja, in Bulgaria, in 1901. It has been referred by Dykes to *I. Sintenisii*, Janka, but is now found to be distinct owing to the glaucous leaves with white asperites on the nerves, the lax spathes and the shorter perianth-tube.

Briar Wood for Pipes.—An idea of the importance of briar wood for the manufacture of tobacco pipes can be gathered from a note that appeared in the Diplomatic and Consular Report, No. 5111, Annual Series, 1913, p. 6, dealing with the trade of Corsica for 1912. For many years past briar wood has been exported in considerable quantities from Sicily, Calabria, and other places, but Corsica now appears to have developed a flourishing business likewise. The above-mentioned note refers to the wood as follows:—"Corsica seems to have an almost unlimited quantity of briar roots, and there is no reason why the industry of cutting them up for tobacco pipes should not continue to flourish. The quality of the Corsican roots is excellent, and is very little behind Sicilian briar wood. The pipes are not finished in Corsica, the roots only being cleaned and sawn into small blocks. Up to the present time nearly all the blocks have been shipped to St. Claude, but during the year under review 523 tons were shipped to other countries, the United Kingdom taking 250 tons of this amount. The price of the roots has risen considerably, some six years ago it only being 2½ fr. the 100 kilos., whereas at present it is 5 fr. 60 c."

Briar wood is obtained from the tree heath (*Erica arborea*), and the pipe blocks are cut from nodules which form on the roots. These nodules are very hard and vary considerably in size, many being from 9 to 12 inches in diameter. The burr-like character of the wood presents a singular appearance by reason of the twisted fibres, and when filled and polished is often very beautiful. *E. arborea* is known as a large bush 15 to 20 ft. high, with tiny dark green leaves, and in March and April as a decorative flowering plant of the first quality, the small, fragrant white blossoms being produced with the greatest freedom. It succeeds well in the south of England, and several large masses

of plants 5 or 6 ft. high are amongst the most prominent floral effects at Kew during the spring months. In a few gardens plants are to be found approaching a height of 20 ft., but as a rule the maximum height is not attained here. There appears to be some doubt whether the root nodules are produced in this country, the thorough examination of the roots of old plants being too risky an operation to undertake unless the plants are to be destroyed. In Museum No. 1, a series of nodules and pipe blocks made from this wood may be seen.

The English name "Briar" is a corruption of the French word "Bruyère," meaning heath.

W. D.

Mahonia confusa.—In *Kew Bulletin*, 1914, Mr. Sprague points out (p. 232) that C. K. Schneider, in his enumeration of the Asiatic species of *Mahonia*, has left out *M. confusa* and referred one of the type specimens of this species to *M. Fortunei*. Schneider also appears to have re-described *M. confusa* as a new species, *M. Zemanii*, from a fruit-bearing specimen collected by Wilson (Sargent, Pl. Wilson. vol. i. p. 378). I have not had the opportunity of examining the type of *M. Zemanii*, but have no doubt of its identity with *M. confusa*, judging from his description and notes (l.c. p. 379). Schneider also mentions in his notes that a specimen collected by Henry (no. 3351), which consists of three leaves only, resembles his *M. Zemanii*. I have not been able to examine this particular specimen, but Henry's No. 3351A actually represents *M. confusa*, and is one of the type specimens.

M. confusa differs from its nearest ally *M. Fortunei* not only by the character of the terminal leaflet and of the basal pair, as pointed out by Sprague and by Schneider respectively, but also in having the petal bifid at the apex and the stamen, with a broad, nearly flat connective, whereas in the other species the petal is entire, and the connective apiculate-triangular.

H. T.